

White Paper

Constructive Disruption

Exploiting Publicly Available Information to Address Today's Security Challenges

by David E.A. Johnson, Varun Vira, and Thomas Ewing

February 2019

ABOUT C4ADS

C4ADS (www.c4ads.org) is a 501 (C) 3 non-profit organization dedicated to data-driven analysis and evidence driven reporting of conflict and security issues. We seek to alleviate the analytical burden carried by public sector institutions with studies and reports of depth and rigor.

Our approach leverages nontraditional investigative techniques and emerging technologies. We recognize the value of working on the ground in the field, capturing local knowledge, and collecting original data to inform our analysis. At the same time, we employ cutting edge technology to manage and analyze that data. The result is an innovative approach to conflict prevention and mitigation

LEGAL DISCLAIMER

The mention of any individual, company, organization, or other entity in this report does not imply the violation of any law or international agreement, and should not be construed as such.

ACKNOWLEDGEMENTS

The authors would like to sincerely thank the team of C4ADS analysts who happily gave their time and skills to assist with graphic design, editing and layout. This White Paper would not have been possible without their participation. We would also like to thank Dr. John Bodnar, Dr. Aaron Arnold and other peer reviewers who provided feedback on various drafts. Finally, none of this would be possible without the support of our technology and NGO partners.

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ABOUT THE AUTHORS

LTC (Ret) David E.A. Johnson, USA

LTC (Ret) David E.A. Johnson, USA, Executive Director of C4ADS, is a graduate of the United States Military Academy at West Point, the Command and General Staff Course, the Joint Defense College at the Ecole Militaire in Paris, and holds a Master's degree in the History of Strategy from La Sorbonne. His military career is outlined in the Congressional Record. Before coming to C4ADS, he worked for Intel Corporation as Director of Digital Security Products in the Software and Solutions Group. He speaks French, Russian, and Arabic.

Varun Vira

Mr. Varun Vira, Chief Operating Officer of C4ADS, received degrees in International Relations and Economics from Syracuse University, and a Master's in International Affairs from George Washington University. Varun's work at C4ADS has been featured in the daily intelligence briefings at the very highest levels of the U.S. government. He previously worked as a consultant for the World Bank, in the office of then-Senator John Kerry, and at the Center for Strategic and International Studies. Varun speaks Hindi and Urdu fluently.

Thomas Ewing, JD

Mr. Thomas Ewing, JD, Chief of Analysis at C4ADS, received undergraduate degrees in International Relations and Russian from the University of Iowa and a JD from Harvard Law School, where he was President of the National Security Law Association. Before law school, he worked for two years as an analyst at C4ADS, where his work was briefed in front of senior audiences at the Departments of Defense, State, and Treasury, in addition to private sector audiences. He has worked in the US government, for international law firms, and in private sector due diligence. Tom is a Russian, Spanish, and Mandarin Chinese linguist.

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Executive Summary

Successful competition in the “gray zone” or globally networked conflict economy requires effective use of Publicly Available Information (PAI). The growth of PAI represents a historic leveling of the playing field in the realm of research and analysis. PAI is not intelligence unless it is used in an intelligence product. PAI differs from open source information in significant ways. Sources of PAI include general media, social media, commercial databases, public records, gray literature, audio, imagery, and expert interview in a wide variety of qualitative, quantitative, structured and unstructured formats and languages. The PAI environment forces a shift in focus from low context, sensor-driven approaches to high context, hypothesis driven approaches. The exponential increase in volume, variety, velocity and availability of public data has eroded government information advantage. Civil society organizations have already demonstrated the strength of PAI to produce sophisticated products that provide credibility and decision advantage for law enforcement, defense, and security needs. PAI has greater value than classified information in a networked world that relies upon information sharing to compete. Effective use of PAI demands an agile mix of people, data, technology, and partnerships.

Why is Publicly Available Information Important?

State-sponsored and non-state illicit actors hide themselves within, and poison, the licit systems that bring prosperity to billions of people around the world. These actors perpetrate the official corruption, transnational crime, and political violence that destabilizes states, prevents development, and devastates the environment. This is where Constrained Military Operations or “gray zone” competition occurs.¹ Systems of trade, transport, finance, and communications, among others, generate reams of data belonging to private individuals and organizations. In a globally-networked, open-data world, everything and everyone produces Publicly Available Information (PAI). This data exposes state sponsored and non-state illicit actors; can provide a major information advantage; and is more easily shared than proprietary data to create secure, efficient supply chains and alliances to solve complex security challenges.

According to the US Office of the Director of National Intelligence, PAI is “information that has been published or broadcast for public consumption, is available on request to the public, is accessible on-line or otherwise to the public, is available to the public by subscription or purchase, could lawfully be seen or heard by any casual observer, is made available at a meeting open to the public, or is obtained by visiting any place or attending any event that is open to the public.”² *A more useful definition: PAI is any general media, social media, public record, commercial database, gray literature, audio, imagery or expert interview that can be legally purchased, obtained or created by the public.* This information is not limited by the number of sensors or the collection budget of any one organization. Bureaucratic procedures involved in tasking, collection, processing, exploitation, or dissemination do not constrain its use. Moreover, since these sources are publicly available and standard scientific methods are used for analysis, PAI is not intelligence, unless it is used in an intelligence product.³ Because of similar data sources, civil society often incorrectly uses the term, OSINT, to describe the results of PAI research and analysis. Traditional Open Source Intelligence (OSINT) emphasizes general media and uses intelligence processes to produce an intelligence product for a government consumer. Defining the opportunity as open source information (OSIF) inaccurately portrays the PAI space.⁴ Today’s open source information or “open data” is made available by government, industry or individuals to reuse without copyright or other mechanisms of control. PAI includes data that may be controlled, but accessible to the public within the bounds of those controls. This distinction between PAI and OSINT is essential for public-private information sharing. OSINT can be classified and has inherent limits on information sharing. OSIF and open data information simply are not broad enough to support a multi-source approach. *PAI products can replicate the integration of multiple traditional intelligence disciplines and produce a wide variety of professional analytic products.*⁵

Unlike the constraints on actual OSINT, PAI sits in a highly dynamic environment containing structured, unstructured, qualitative, and quantitative data in a vast array of languages and formats that can provide insight into all forms of observable phenomena. Moreover, this environment, like illicit networks themselves, is decentralized. The ability to take advantage of its possibilities—both licit and illicit—continues to democratize.⁶

UNITED STATES DISTRICT COURT
SOUTHERN DISTRICT OF NEW YORK

REA NAVIGATION, INC., Plaintiff,
- against - Kaalbye and shells
WORLD WIDE SHIPPING LTD., KAALBYE PROJECTS, KAALBYE SHIPPING INTERNATIONAL LIMITED, and SILVER STREAMS LTD., Defendants.

SHIRA A. SCHEINDLIN, U.S.D.J.

I. INTRODUCTION

On January 15, 2009, this Court entered an ex parte order on behalf of REA Navigation, Inc. (“REA”), directing attachment and garnishment of the assets of World Wide Shipping Ltd. (“WWS”), or Kaalbye Projects, Kaalbye Shipping International Limited, Silver Streams Ltd. as alter egos of WWS. In total, this

upon information and belief, Defendants have or will have during the pendency of this action, assets within this District and subject to the jurisdiction of this Court held in the hands of garnishees including, but not limited to, Bank of America, Bank of New York Mellon, Citibank, HSBC Bank USA NA, J.P. Morgan Chase, Standard Chartered Bank, Wachovia Bank N.A., Deutsche Bank AG, ABN AMRO Bank N.V., American Express Bank Ltd., Lloyds TSB Bank Switzerland PLC, Banca Monte Dei Paschi Di Siena S.P., Barclays Bank, Bank of China, BNP Paribas, Societe Generale Bank, Credit Suisse, Mashreq Bank and/or UBS, which are believed to be due and owing to Plaintiff.

Open data US court documents from PACER describe a Syrian arms deal with named entities

Multiple actors in a global marketplace hold important pieces of the puzzle—some with trade and corporate records, others geospatial data, and still others publicly accessible signals metadata and records. In a world awash with PAI, information advantage is about (a) identifying the relevant pieces of the puzzle, and (b) forming partnerships to bring them together for action. A successful competitor must be as agile as the data.

Classified Ads

Searching classifieds ads can help to verify contact information and may provide identifying information that can be used to search the national business registries.

Sample: Chinese Classifieds Ad

The sample ad is for '大连杰克船舶管理有限公司' (Dalian Jack Ship Management Co., Ltd.). Red arrows point to the following fields:

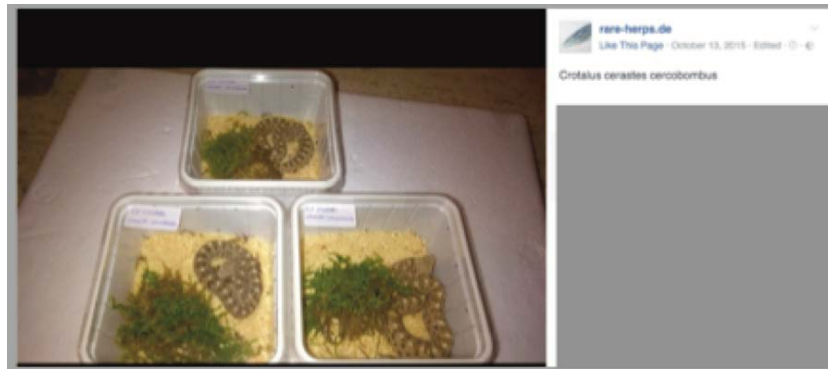
- Organization Name:** 大连杰克船舶管理有限公司
- Contact Person:** 魏松涛
- Phone Number:** 13940790112
- Address:** 辽宁省大连市中山区大连杰克船舶管理有限公司
- Email:** 13940790112@163.com

Classified ads are useful open data when linked to PAI registries. Source: C4ADS training module

The growth of PAI represents a historic leveling of the playing field in the realm of research and analysis. Effective collection and exploitation of this information can give any actor a massive decision advantage. Civil society, non-governmental, journalistic, academic, and commercial organizations can analyze PAI data for disruptive insights. Non-Governmental Organizations and commercial entities like *Bellingcat*, the *James Martin Center*, or *AllSource Analysis* have developed professional capacity for imagery processing.⁷ Government defense and security organizations can best use PAI, due to its ad hoc nature and varied update timing, to understand strategic indicators and warnings, or target threat system vulnerabilities. Moreover, Internet of Things data is creating real-time tactical value for all sorts of analytic organizations.⁸ The effective use of PAI can provide vastly more effective unity of effort. Optimizing its use demands the right mix of data, technology, people and partnerships.

PAI Can Provide Unique Insights

PAI is most able to fuel insights when different forms and sources of PAI combine. The most effective users must bring together disparate data sets, data management technologies, and flexible organizational processes to adapt to the ever-changing volume, variety, velocity and availability of data sources.⁹ For example, an analyst may combine the Venezuelan military contractor registry, the Florida property and business registries, the Nicaraguan intellectual property registry, and social media to map Venezuelan capital flight. Most projects require a similar type of data cocktail to provide analytic insight.

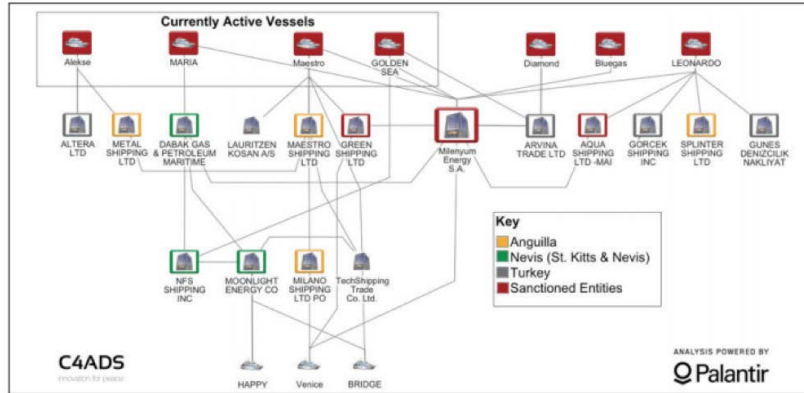


Trafficked snakes in their containers from C4ADS Report “Flying Under the Radar”. Source: Facebook

Publicly Available Data Defies Control

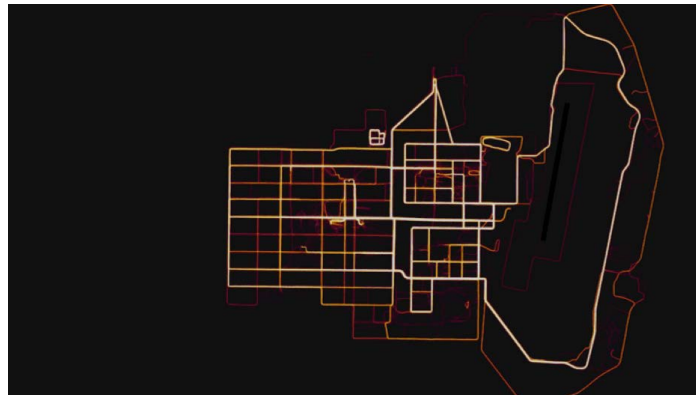
The chaotic data environment creates challenges and opportunities for any analytical organization. First, the **volume** of available data is too large for one organization to collect, structure and analyze. The Center for Advanced Defense Studies’ (C4ADS) proprietary data ingest pipeline and data lake yielded 5.4 terabytes of document information in July 2018 alone, equating to 54 million documents across 42 databases in 22 jurisdictions. At this volume, analysis requires identifying needs to narrow the scope of data collection. Illicit networks must nest within licit systems of trade, transport, and communications in order to operate.¹⁰ The analyst identifies the data sources that best illuminate these systems: corporate registry data, for example, is essential to map ownership patterns of corporate entities used to hide illicit networks. Trade data can help uncover the movement of their goods.

Second, the **variety** of useful data demands that analysts integrate multiple different sources and types of data. For example, as of July 2018, C4ADS identified over 400 unique databases with official corporate registry information in 163 jurisdictions, each holding relevant data on companies and individuals, in different languages, file types, and formats. The broader investigative community has identified only a minority of these datasets. These represent a fraction of the total corporate data providers and may exclude entire verticals such as trade, finance, legal, media, or assets/liabilities. Each vertical has thousands of useful bulk datasets. This does not even begin to describe available imagery and other types of data. With a wide range of sophisticated, publicly available capability for geospatial, signals, measurements, imagery, social network, discourse and statistical analysis, the need for the type of analyst who can take advantage of these opportunities becomes evident.



Palantir Gotham Social Network Analysis diagram of vessel ownership from C4ADS report "Sandcastles"

Third, the **velocity** of PAI creates technical challenges for acquisition, pre-processing, and analysis. Products are the result of interaction between data management, analysis and requirements layers.¹¹ The speed of this interaction keeps increasing towards real-time.¹² This requires an ability to rapidly scale and adapt a cloud-based environment that demands custom-built technical solutions. C4ADS shares a similar challenge as government and provides a useful model. Working with transponder data, updated every five minutes for maritime analysis, requires a specialized data management infrastructure. At a recent demonstration, a C4ADS analyst was able to use Palantir Foundry to upload and analyze an entire economic sector of a country to look for money laundering anomalies- in minutes. Data is created and changes continually. The datasets the Center aggregates must exist in perpetuity in the C4ADS data environment. Some are removed from the internet by the kleptocratic regimes whose activities they detail, while others are acquired through partner relationships and exist only in C4ADS' data environment.¹³ Data access, data sets, and data aggregators can blink into existence and back out because of regulatory or commercial pressures. All are time-sensitive.



Strava Map Photograph showing joggers at a base in Helmand, Afghanistan. Source: The Guardian, <https://www.theguardian.com/world/2018/jan/28/fitness-tracking-app-gives-away-location-of-secret-us-army-bases#img-1>

Finally, the distributed ownership of useful data creates greater **availability** and the opportunity to avoid 'recreating the wheel'. Someone somewhere has the data needed to create strategic, operational and tactical advantage. Organizations using PAI need a rapid and flexible procurement system that allows them to integrate new data sources from a variety of vendors and locations. These are often the same vendors that government currently uses, for example *Dun and Bradstreet*, *Bankers Almanac*, *Sayari Analytics*, *Planet*, or *Panjiva*.¹⁴ Currently, entities outside of government can onboard (and offboard) these same vendors in a matter of hours. This



Chinese port development activity at 7m resolution in Djibouti, left image–October 2015; right image–January 2019. Source: Planet

allows non-government entities to mix and match data sources as needs arise with limited cost. Each PAI analyst can serve as a procurement specialist, constantly on the lookout for new boutique data sources that can be donated, bought, or bartered.

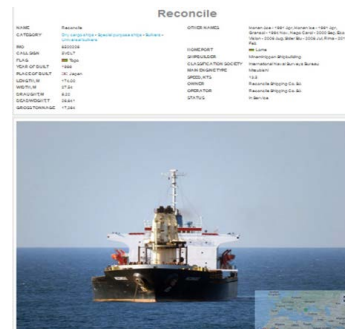
Flexible Use of Technology Enables Special People

Emerging technologies create unprecedented possibilities. Information, once available only to government agencies, is now available to anyone with the right tools. However, not all tools are created equal. Some are not yet fully developed for analyst use. Others have enormous potential but cannot easily be integrated into existing workflows. The rules of thumb must be simple. Tools must be tested by the actual analysts prior to onboarding. The underlying data must always be available to analysts for sourcing. If a tool does not reduce an analyst's time on task by at least 5-10%, it should be discarded. These principles alone can sort out providers of vaporware and junkware.

The emerging data environment demands regular investment and update in tools - both adapting off-the-shelf technologies, as well as custom building one's own. C4ADS in-house data lake was conceived from analyst needs. Built on *Amazon Web Services* (AWS), it is scalable, allowing the Center to collect, sort, search and analyze millions of public record.¹⁵ This allows C4ADS to make corporate registries from China, Colombia, and Russia “talk to” one another. The Center has matched this capability with a global network of sensors and platforms to track vessels at sea and in the air, allowing insights concerning the movement and ownership of illicit cargo, including through partnerships with cutting-edge emerging technology vendors such as *Windward Inc.*¹⁶ Similarly, a longstanding partnership with *Palantir* has given the Center an intuitive way to organize investigations, demonstrating connections between illicit networks, which would have seemed separate without bulk public records research.¹⁷ Additionally, analysts, using R and Python, have developed a myriad of their own tools to speed up specific analytical processes.



Global ship tracking image. Source: Windward maritime intelligence platform



Global ship Image and data for a vessel. Source: Ship Photo Roster, <https://ship-photo-roster.com/ship/reconcile>.

Technology is only a tool, not a solution. Legacy systems grow outdated, and bandwidth, storage, and processing restrictions limit what any organization can do.¹⁸ Staying at the cutting edge of technology requires a partnership model. Speed of insight is often more valuable than intellectual property. Because of this, C4ADS often receives technology solutions before they are available to government or the market. At this moment, C4ADS analysts are beta-testing *Palantir* software upgrades, *Amazon AWS* machine learning tools,¹⁹ and *Google Advanced Security Protection* digital security kits.²⁰



Open Source Covert Shores and Bellingcat partial summary of available tools as of February 2018. Source: http://www.hisutton.com/OSINT_Landscape.html

Special People are Essential to Exploit the PAI Environment

Optimizing the use of PAI begins with high-context people. The dynamic and complex PAI environment does not readily lend itself to drill, process, and standardized approaches. This type of work is analyst-driven, requiring adaptability, curiosity, perseverance, critical thinking, intuition, qualitative and quantitative competence, and extroversion. Leaders can spot high-context attributes in rapid technology adoption, foreign language proficiency, a top-tier university educational background, overseas experience, and a wide social network. A potential PAI analyst should demonstrate autonomy, passion, intellectual curiosity, perseverance and their ability to integrate into a fast-paced analytical team. These things separate the high-context analyst that can develop the hypotheses, forage for emerging data sources, make sense of appropriate patterns, and build and test the evidence-based arguments that are essential to make the most of PAI.

Training in acquisition and analysis refines and challenges carefully selected raw intellectual talent, eliminating those who cannot adapt to the environment. The PAI environment forces a shift in focus from low context, sensor-driven approaches to high context, hypothesis-driven approaches.²¹ Given its dynamic nature, all analysts in this space begin equal, regardless of age, prior qualifications or degrees, clearances, or work histories. Training should begin with the basic principles of analysis and key postulates about discovery of illicit networks. But, training should also describe the role and nature of descriptive, predictive and prescriptive analysis; strategic models and conceptual modeling; and data foraging, assessment and structuring. Good training will introduce analysts to a large array of tools, datasets, and techniques, yet prescribe none, leaving it to the analysts to choose the best mix for their specific challenge. And, while

training should begin with a series of immersion courses, training never ends. Throughout an analyst's career, they should be evaluated on their proactivity in taking advantage of targeted educational opportunities, and their ability to work with peers to take on and disseminate new lessons learned. Every PAI analyst should be pushed to regularly interact with outside experts, travel overseas, meet with potential partners, and present high-level briefings.



C4ADS analyst presents a maritime investigation at the Japan Space Forum, Tokyo 2019. Photographs: Japan Space Forum

Any training curriculum should include standards and best practices from the intelligence community as well as due diligence and investigative journalism industries.²² Perseverance is an essential aspect of training and selection. With unlimited “sensors” in PAI, it takes longer to prove a negative than it does to find an expected answer, requiring the disciplined use of structured analytic techniques.²³ The nature of the open-data environment drives the need for a unique type of analyst, around whom data and technology acquisition strategies revolve.

PAI Drives Action Through Partnerships

One objective of any analytical organization is to provide actionable insights to consumers, including policy and decision makers. Therefore, products need to be accessible in content, transparent in sourcing, and flexible in distribution. This creates a strong need for public-private partnership. Governments should be able to use PAI derived from civil society organizations in a form of hybrid warfare against illicit networks and rogue states. To have a significant impact, an organization must disseminate findings to the right audience, at the right time, with the right data to drive action. For example, C4ADS initiated a partnership with *Archer Impact* to create a free open source tool, Sanctions Explorer, that enables government and civil society to more effectively search and use 24 years of US Treasury sanctions data.²⁴ In each partnership, an organization must provide a *mutually beneficial value proposition*. This is based on unique organizational capabilities and advantages.

Build broad-based access...

The effectiveness of the PAI user's people, data, and technology efforts is tied to partnerships. Partnerships go through phases of *familiarity, access, influence, and responsiveness* that take time to develop. Partners require trust to build mutual structural, activity and cultural awareness. For example, C4ADS status as a non-profit helps it forge connections which governments and for-profits have difficulty building. Some of its relationships have developed over years. Inhabiting a space between public charity, academic research, investigative journalism, data analytics, and commercial due diligence, the Center invests in the ability to speak the language of all these industries, rather than demanding they all read from 'the same sheet of music.'

As a non-profit, the Center can collect almost any information, work with almost any partner, and distribute to almost any outlet. The Center currently partners with over 250 Non-Governmental Organizations and 63 Law Enforcement Agencies for information sharing and training. This provides opportunities like access to the Customs Enforcement Network.²⁵ C4ADS' status also grants protection under laws such as the Washington, DC Anti-Strategic Lawsuits Against Public Participation statute.²⁶ Because a non-profit is mission-driven, C4ADS is not beholden to concerns which can hamper the freedom of a for-profit, government agency, or a political actor. Other sectors have their own unique advantages, but all must find a way to build partnerships into their organizational ethos.

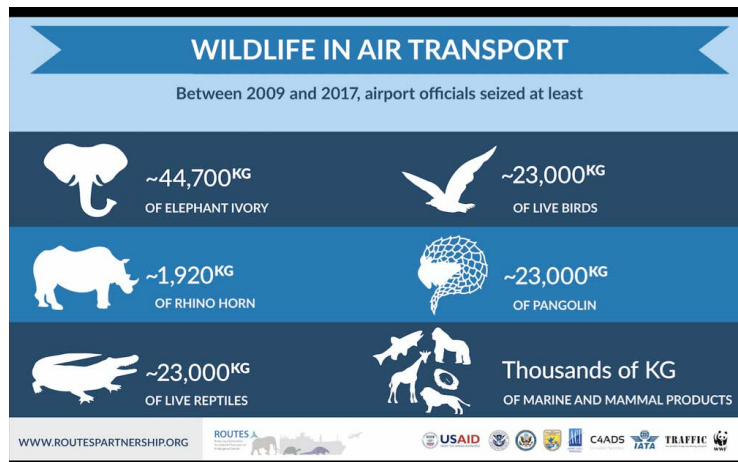
This flexibility to partner creates access to unique sources of data. A mission-oriented approach has led like-minded individuals and organizations to donate datasets (such as the "Sandcastles" dataset of property ownership in Dubai, which is helping drive government sanctions) or help pursue enforcement action.²⁷ With research unconstrained by geography or function, and unconstrained partnerships, comes significant information synergy. Each user of PAI needs to take advantage of its particular capabilities and advantages. *Many have significant authorities that others, like C4ADS, lack.*

...to drive tangible action

Combating illicit networks means recognizing that they operate in ways that cut across organizational authorities. Government departments, foreign partners, the private sector, and civil society all have a role to play in denying terrorists, corrupt officials, traffickers, and sanctions evaders opportunity. To combat a network, it takes a networked approach. This requires skill in influence and collaboration, as opposed to an emphasis on defined command and control relationships. Avoiding cumbersome bureaucratic processes, each partner fulfils their own interest, while achieving a common goal, rather than requiring a formal tasking

relationship with strict contractual or regulatory obligations.

Information cohesion is foundational to a networked approach. One organization cannot collaborate effectively with another, if it cannot share the information which forms the basis of its action. Government need to protect sources and methods compounds difficulties- creating classified information. Commercial entities, academia or media may perceive a need to protect competitive advantage against peers. At times organizations can bridge this gap, but the need to protect sensitive information means that collaboration will never be frictionless.



A C4ADS partnership with Government and other Civil Society Organizations targets a vector for transfer of illicit wealth. Source: USAID ROUTES

However, organizations can share products derived from publicly available data with very few restrictions. Proper sourcing and ingestion are key to this effort. It is essential to document provenance, handling, and processing. All PAI products should be relevant, competent, material, and admissible in a court of law. Ensuring acquisition and products meet the standards set by the UK Anti-Bribery Act, the US Foreign Corrupt Practices Act, and the US FISA Amendment 2008, among others, creates the freedom to distribute reliable information quickly, transparently, and confidently with partners across government, international organizations, the private sector, media, and civil society without violating the regulatory environment of any potential partner.²⁸

²⁹ ³⁰ When the enforcement powers of all partners are brought to bear on the same targets, using the same information, the impact can be much greater than if any of these entities had acted alone.³¹

Become a Power User of PAI

The ability to optimize the use of PAI requires the right mix of people, data, technology, and partnerships. To create this capability:

1. Design personnel selection, training, and mission command to take advantage of the emerging data environment.
2. Build infrastructure and reduce process to merge dynamic, disparate data types and sources.
3. Discover, buy, rent, build, and integrate disruptive new tool sets rapidly to empower high-context analysts.
4. Create a strong network of strategic alliances in government, academia, technology, and civil society to enhance the velocity and effectiveness of action.

The proliferation of publicly available and open data represents a historic leveling of the playing field in the realm of research and analysis.³² The empowerment of civil society makes public-private partnerships essential to counter the growing power of asymmetric or hybrid threats. Properly collected and exploited, PAI will give any actor a massive decision advantage against its foes. The information that drives the legal systems of trade, communications, transportation and finance exposes the illicit state-sponsored and non-state networks embedded within them. Therefore, the challenge of defeating illicit networks is inextricably linked with the ability to exploit and share PAI.

Effective use of PAI can enable strategies and policies that reshape the eco-system in which illicit networks form and thrive. Government and civil society need to work together to shape a secure and prosperous world for open, pluralistic societies. Moreover, reducing threats before a conflict, not only reduces the risk of conflict, but also proportionally increases the effectiveness of existing government capabilities in a conflict. Further, a comprehensive approach in the “gray zone” conflict economy may drive remaining asymmetric threats to face government under more conventional terms, where government excels.

Recent Reports from C4ADS



Endnotes

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system, provides a global data platform for corporate and public records information offering seamless universal search with full provenance and traceability. <https://sayari.com/>.

15 Sean Leahy, C4ADS Senior Data Advisor presented this approach at the Data Architecture Summit run by Dataversity in Chicago, IL on 10 OCT 18. <https://das2018.dataversity.net/sessionPop.cfm?confid=124&proposalid=9945> last accessed 29 SEP 18.

16 Windward is a maritime domain analysis data partner, <https://wnwd.com/company/> last accessed 29 SEP 18. C4ADS has partnered with ADSB to produce tools for air domain analysis, <https://www.adsbexchange.com/> last accessed 29 SEP 18; and provided capability to civil society groups like the Organized Crime and Corruption Research Project, <https://tech.occrp.org/blog/2018/06/11/adsb.html> last accessed 29 SEP 18.

17 C4ADS is a high impact Palantir philanthropic partner. <https://www.palantir.com/philanthropy-engineering/annual-report/2017/c4ads.html> last accessed 29 SEP 18.

18 Moore's Law identifies the continuous exponential rate of change in the computing environment. <https://www.intel.com/content/www/us/en/silicon-innovations/moores-law-technology.html> last accessed 29 SEP 18.

19 C4ADS is an Amazon Web Services partner, <https://aws.amazon.com/blogs/apn/tag/c4ads/> last accessed 29 SEP 18.

20 The Google Advanced Protection program provides end point security solutions. <https://landing.google.com/advancedprotection/> last accessed 29 SEP 18.

21 Bodnar, John W. "Warning Analysis for the Information Age: Rethinking the Intelligence Process". Washington, DC: Joint Military Intelligence College, 2003. Dr. Bodnar is a C4ADS Fellow. http://ni-u.edu/ni_press/pdf/Warning_Analysis.pdf last accessed 29 SEP 18.

22 There are a wide variety of resources that can enhance research in PAI. For example, there is an online Privacy Guide for Journalists 2018. <https://www.vpnmentor.com/blog/online-privacy-journalists/> last accessed 29 SEP 18.

23 Heuer, Richards J. Jr, and Person, Randolph H. *Structured Analytic Techniques for Intelligence Analysis*. Washington, DC: CQ Press, 2011. This is a great resource to bring rigor to research efforts.

24 Learn about and use Sanctions Explorer at <https://sanctionsexplorer.org/about> last accessed 29 SEP 18.

25 C4ADS partnered with the World Customs Organization to produce the 2016 Illicit Trade Report, <http://www.wcoomd.org/en/media/newsroom/2017/november/the-wco-releases-the-2016-illicit-trade-report.aspx> last accessed 29 SEP 18.

26 C4ADS pushed the envelope for all civil society organizations with the precedent setting case against Kaalbye Shipping. <https://dcslapplaw.com/2015/04/09/three-takeaways-from-the-dc-superior-courts-order-granting-c4adss-anti-slapp-motion/> last accessed 30 SEP 18.

27 C4ADS. "Sandcastles: Tracing Sanctions Evasion Through Dubai's Luxury Real Estate Market". Washington, DC: C4ADS, 2018. <https://www.c4reports.org/sandcastles/> last accessed 30 SEP 18.

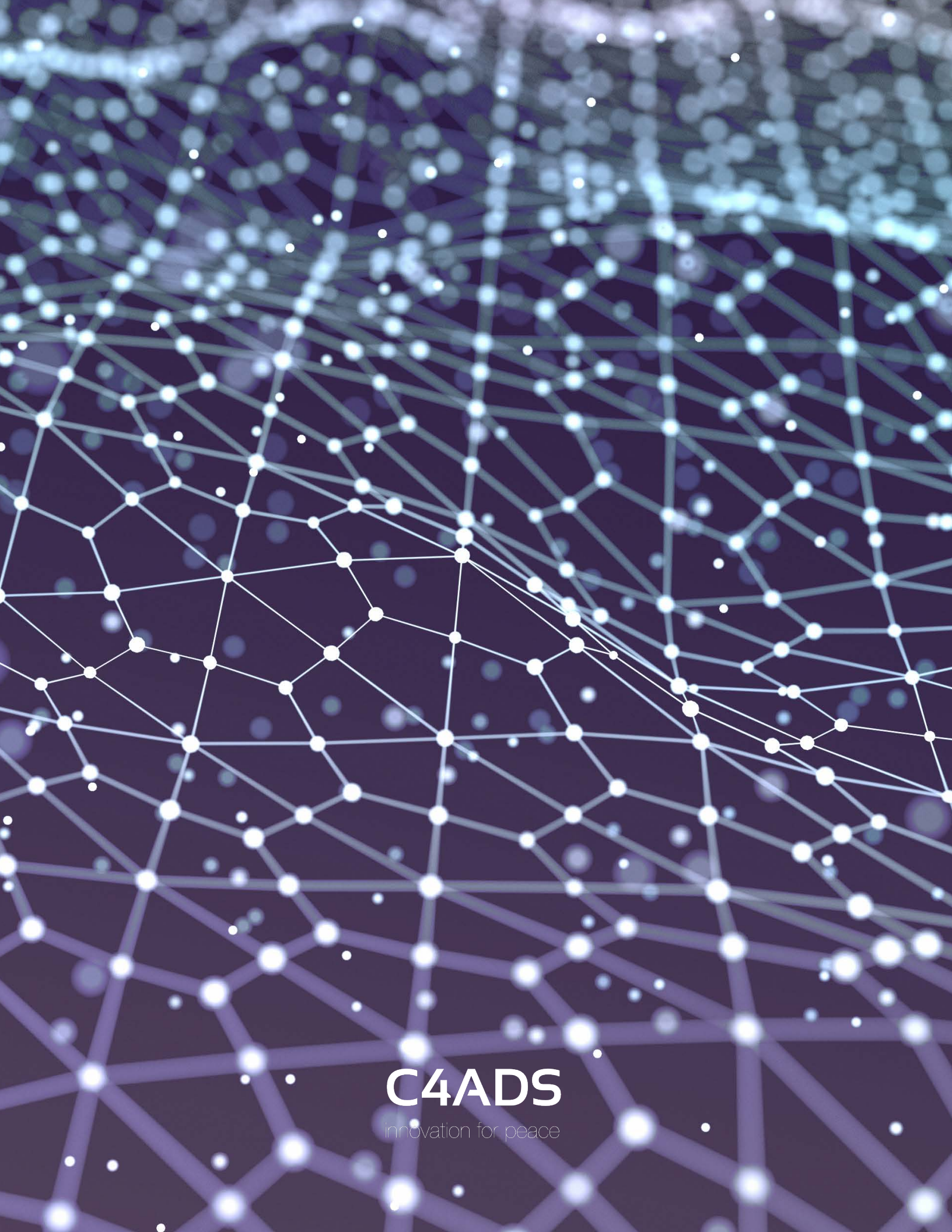
28 United Kingdom. "Anti-Bribery Act 2010". London: Parliament, 2010. <https://www.legislation.gov.uk/ukpga/2010/23/contents> last accessed 30 SEP 18.

29 US Congress. "Foreign Corrupt Practices Act of 1977, 15 USC sec. 78dd-1 et seq.". Washington, DC: GPO, 1977. <https://www.justice.gov/criminal-fraud/foreign-corrupt-practices-act> last accessed 30 SEP 18.

30 US Congress. "Foreign Intelligence Surveillance Act of 1978 Amendments Act of 2008, Public Law 110-261". Washington, DC: GPO, 2008. <https://www.intelligence.senate.gov/laws/fisa-amendments-act-2008> last accessed 30 SEP 18.

31 In the past two years, C4ADS has contributed to over 34 sanctions across 7 programs, 2 billion dollars in assets frozen or seized, 1400 tons of contraband seized, 120 arrests, and the establishment of coalitions for enhanced due diligence in the insurance, banking and manufacturing industries.

32 Courtney Weinbaum et al, “ Perspectives and Opportunities in Intelligence for U.S. Leaders”. Santa Monica, CA: RAND, <https://www.rand.org/pubs/perspectives/PE287.html> last accessed 1 NOV 18. This excellent work has a chapter on the PAI opportunity tailored to the government IC framework and indirectly describes C4ADS sanctions work on the DPRK challenge.



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